

# **USDA and Cotton in Kern County**

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**Lyle Carter**  
**Agricultural Engineer (Retired)**  
**USDA, ARS**



## ACALA COTTON SHAFTER COTTON RESEARCH STATION

THE SHAFTER COTTON RESEARCH STATION, ESTABLISHED HERE IN 1922 BY THE U.S. DEPARTMENT OF AGRICULTURE, DEVELOPED THE "ACALA" VARIETIES WHICH WERE EXCEPTIONALLY WELL-SUITED TO THE SAN JOAQUIN VALLEY. THE QUALITY OF THE ACALA COTTONS AND THE MARKETING ADVANTAGE OF THE ONE-VARIETY COTTON DISTRICT, CREATED IN 1925, RESULTED IN PREMIUM COTTONS WITH A WORLD-WIDE DEMAND. THROUGH THE CONTINUED VISION AND COOPERATIVE EFFORTS OF GROWERS AND RESEARCHERS, PRODUCTION OF ACALA COTTON BECAME ONE OF CALIFORNIA'S LARGEST AGRICULTURAL ENTERPRISES.

CALIFORNIA REGISTERED HISTORICAL LANDMARK NO. 1022

PLAQUE PLACED BY THE STATE DEPARTMENT OF PARKS AND RECREATION IN COOPERATION WITH THE CALIFORNIA COTTON GROWERS ASSOCIATION.  
SEPTEMBER 22, 1997



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# California Cotton Printed History



# C.S. Capp Collection, 1872



# Topics to Cover

- **World and US history**
- **California history**
- **Kern county history**
- **Formation of the Cotton Research Station**
- **Station campus in the 1920's**
- **Impact of station on cotton**
- **Station life**

# World

- **Cotton came from the East (?)**
- **Europe: “a treasure from the Orient”**
- **England: cotton changed history**
  - Cotton promoted colonization
  - Cotton challenged Wool
- **US: cotton molded the South**
  - Gin elevated cotton to world market

# Cotton

## *Old Southern Definition*

- “Cotton is the overcoat of a seed that is planted and grown in the southern states to keep the producer broke and the buyer crazy ...
- The fiber varies in color and weight and the man who can guess the nearest the length of the fiber is called a cotton man by the public, a fool by the farmer and a poor business man by his creditors ...”

# Cotton in California

- Cotton is not a tradition
- Influence of California Missions
- Influence of Civil War
- Influence of California Legislature

# California Legislation Prizes State Agricultural Committee Fair

- 1856 - \$75 prize for best acre
- 1858 - \$25 for best  $\frac{1}{4}$  acre
- 1859 - \$50 for best acre
- 1863 - Prize system totaling \$15,000
- 1865 - \$3000 for 1<sup>st</sup> 100 acres
- 1870 – Last prize

# Kern County Cotton

- 1862 – First Record of cotton grown
- 1863 – Kern Island growers
- 1865 – Kern Island Courier reports
- 1865 – First gin
- 1865 – Prize award controversy

# Cotton Research in California

- **Why was it needed?**
  - Cotton industry languishing in California
  - Market for quality cotton established
  - Markets on the east coast
  - Another war!

# Cotton Research in California

- **A new Concept**
  - **One Variety District**
    - **Aid for marketing**
    - **Concentrate research efforts**
    - **“Jump start” an industry**

# Bill Camp Initiates Program

- Arrived with 32 cotton varieties
- 1917: First field tests
  - Cedar and 24<sup>th</sup>, Bakersfield
- Experimental Plantings
  - from Imperial to Sacramento Valleys
  - Success with big balled cottons
  - Prompted idea of a Research Station

# Origins of “Acala”

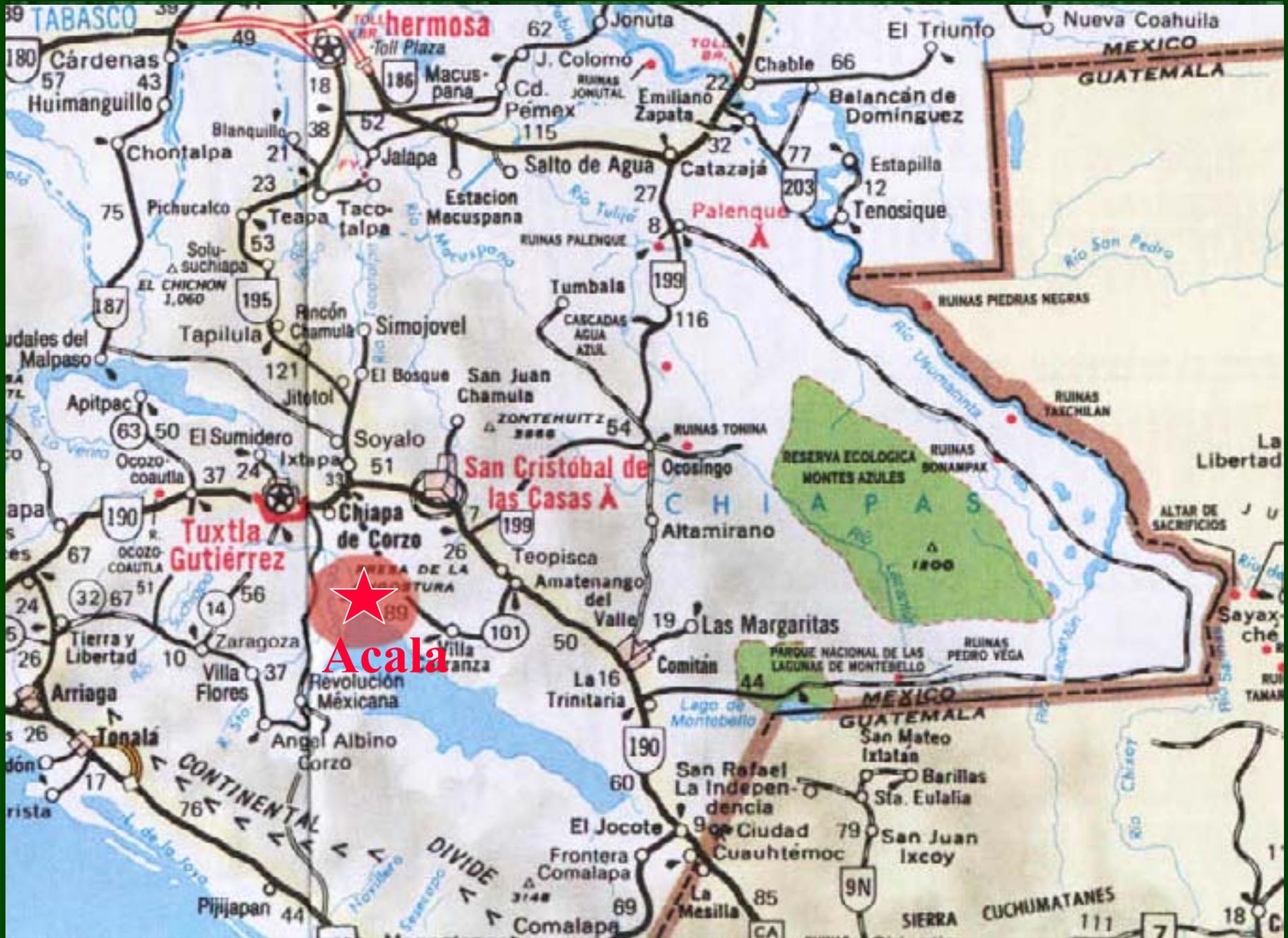
- **Ocosingo, Chiapas, Mexico**
  - Single plant with large bolls and quality lint
- **Acala, Chiapas, Mexico**
  - Small field similar to Ocosingo plant
  - Selections made in Texas and Oklahoma
  - Shafter seed from USDA, Clarksville, Texas
    - Acala 8

**CHECK YOUR INSURANCE  
BEFORE ENTERING MEXICO**

U.S. automobile insurance is not valid in Mexico. Arrange for full coverage, including property damage and public liability, with a reliable Mexican insurance company having complete adjusting facilities in cities throughout Mexico. AAA offices in border states can provide Mexican automobile insurance to members. ACSC and CSAA offices will issue insurance documents for rented vehicles provided that the rental car is driven only in Baja California, the 15-mile border zone along the Mexican mainland or the Mex. 8 "border route" from Lukeville, Ariz. to Puerto Palasco, Son.

**Acala, Mexico**





**Acala**



**San Cristóbal de las Casas**

**Tuxtla Gutiérrez**

**hermosa**

**TABASCO**

**MEXICO GUATEMALA**

**CHIAPAS**

**MEXICO GUATEMALA**

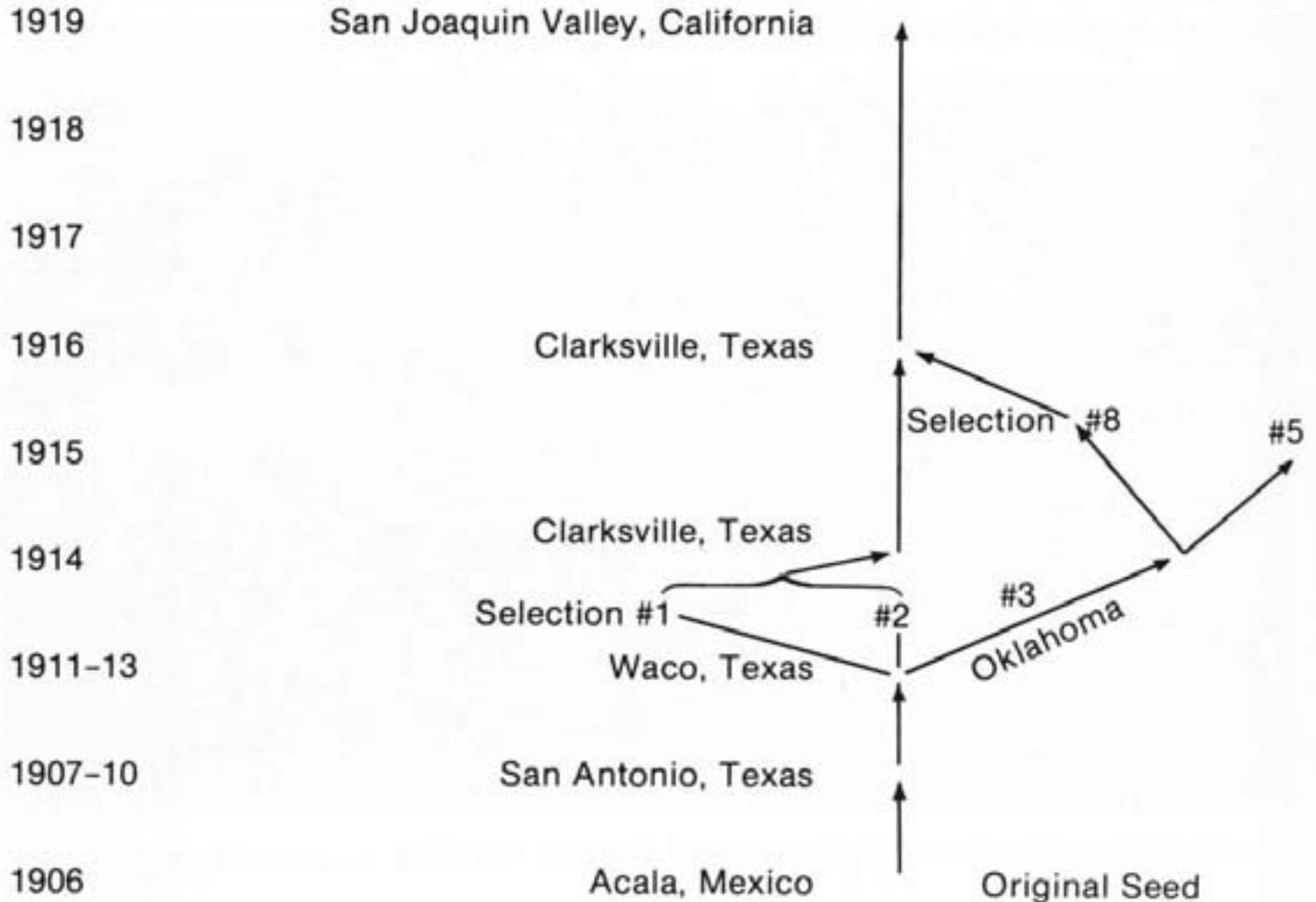
**CONTINENTAL DIVIDE**

**SIERRA CUCHUMATANES**

# Native Mexican Tree Cotton



# Early Years of Acala, 1906-19



# Pima Cotton, late 1920's Fred Herbert, Breeder



# The Station Sited

- **W.B. Camp chose the area for the site**
- **40 acres from Kern County Land Company**
  - **Nov 9 1921; Agreement Authorized**
  - **Nov 30 1921; Agreement signed by USDA**
  - **Perpetual lease for \$1 per year**
  - **Open prairie or pasture?**

# The Station Develops

- **1922 to 1926 Kern County Allocated \$7,500**
  - Office, employee dwelling, implement shelters
- **300 foot length fields delineated**
  - Labeled A, B, C, & D
- **40 foot wide plots established = 1/4<sup>th</sup> acre**
- **Gravity flow concrete irrigation system**
  - Valve number used to specify field location

# Adobe Office Kern County Experimental Farm



# Reservoir in the 1960's



# Entry and Office Before 1952



# Employee Housing 1923



# Bunkhouse and Guesthouse 1923

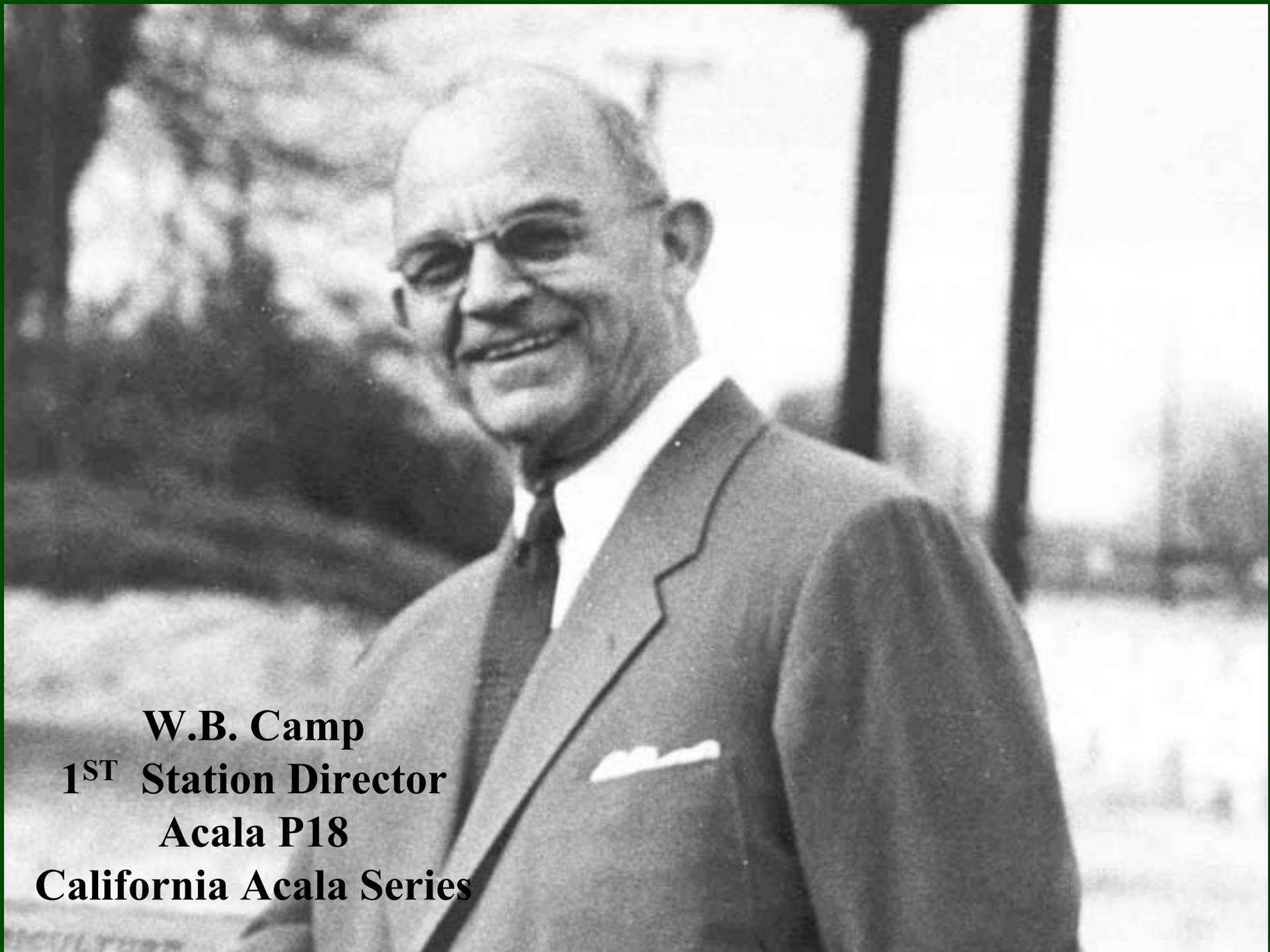


# Additional Land

- **Kern County Land Company**
  - 1925: Sells two 10-acre adjacent field to Kern Co.
    - Origin of fields E and F
  - 1926: Transfers title to original 40 acres
  - Total Cost \$12,000 for the total 80 acres
  - USDA continues lease for \$1 per year
- **The So.-40 purchased 1951 by Kern County**
  - Included in \$1 lease

# ARS Station & Research Leaders

- **W. B. Camp**  
– 1922 - 1934
- **George Harrison**  
– 1934 - 1952
- **John Turner**  
– 1952 - 1967
- **H. B. Cooper**  
– 1967 -1976
- **Lyle Carter**  
– 1976 - 1988
- **Lloyd Elliott**  
– 1988 – 1990
- **Claude Phene (interim)**  
– 1990 -1992
- **John McLaughlin**  
– 1992 - 1998
- **Lyle Carter (interim)**  
– 1998 – 2000
- **Michael McGuire**  
– 2000 -



**W.B. Camp**  
**1<sup>ST</sup> Station Director**  
**Acala P18**  
**California Acala Series**

# The Beginning: 1922 to 1925

- **W. B. Camp, first director**
  - Continues work started in 1917
- **Station becomes center of cotton research**
  - Named “US Experimental Farm”
- **Agronomy and breeding/selecting**
  - Acala 8, Durango and many others
- **Acreage increased from 50,000 to 129,000**
- **Value increased from \$2.8 to \$10.3 million**

# 1925: Crucial Decisions

## Legislative One Variety Law

- “An act to provide for the growing of one variety or species of cotton, to wit: Acala in certain prescribed and defined districts in the State of California: to prohibit the picking of any variety or species other than known as Acala in such districts, prohibits possession within such districts of cottons other than that known as Acala ... penalty for violation of this act.”

April 30, 1925

# The One Variety Idea

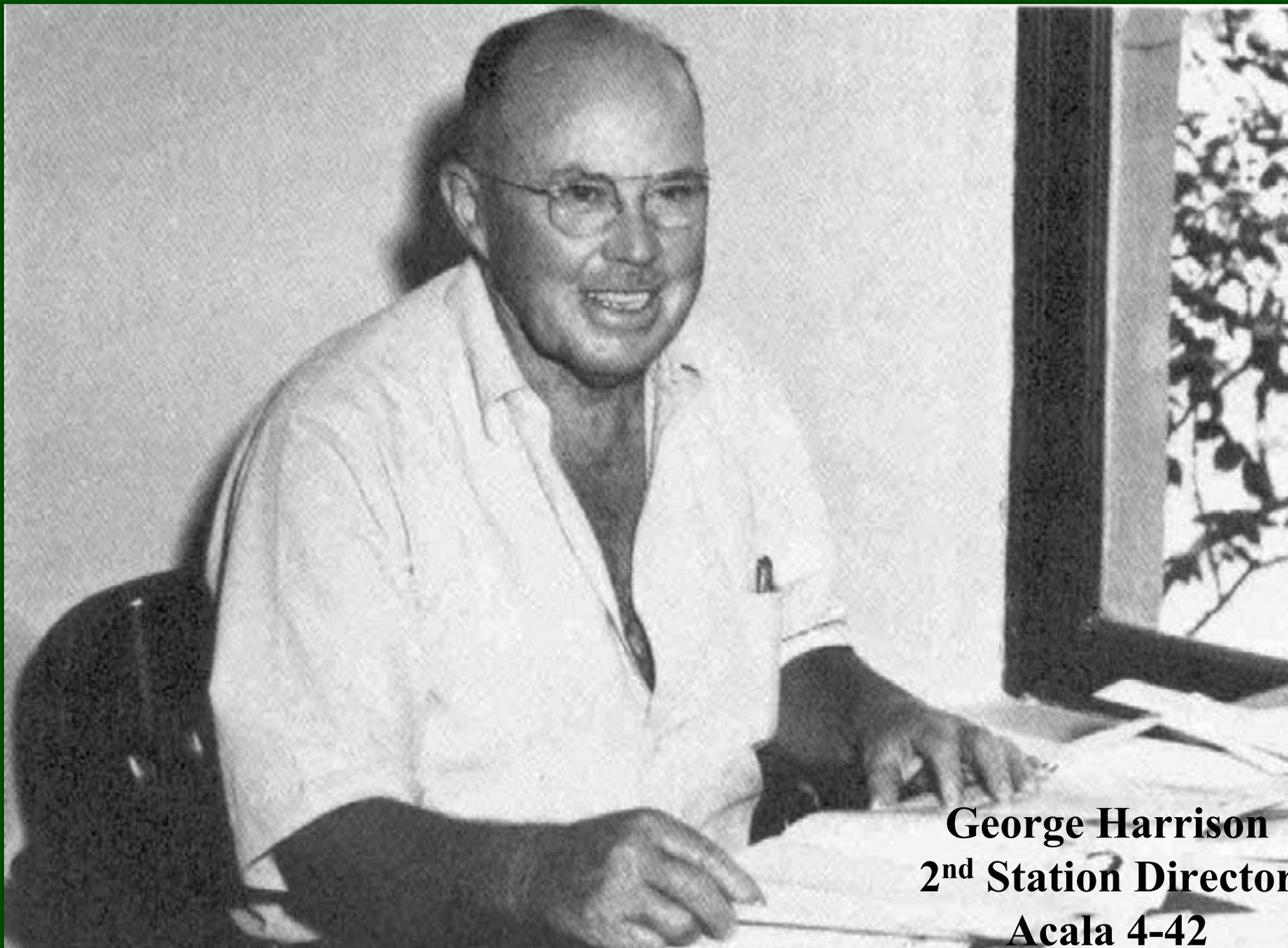
- **Old idea to encourage quality and profit**
  - Uniform product from an area
  - Basis of a reputation
  - Simplified marketing
  - Remove stigma of “foreign” or mixed quality
- **Promoted by Dr. O. F. Cook, USDA**
- **Supported by U.C. Professors**

# Breeding for One Variety Law

- **USDA exclusively responsible for breeding**
  - Defined “Acala”
- **University of California cooperator**
  - Agronomy and Entomology
- **Farm Bureau responsible for increasing seed**
  - Formed the F.B. Planting Cottonseed Distributors
- **Seed release decisions: USDA and UC**

# 1926: First Reorganization

- **California Planting Cottonseed Distributors**
  - Management of seed a burden for Farm Bureau
  - A cooperative of all California cotton growers
  - Responsible for increase of parent seed
  - Responsible for distribution of seed
  - Responsible for maintenance of quality
  - Provides support for breeding and station



**George Harrison**  
**2<sup>nd</sup> Station Director**  
**Acala 4-42**

# Cotton's Critical Age

1930's and 1940's

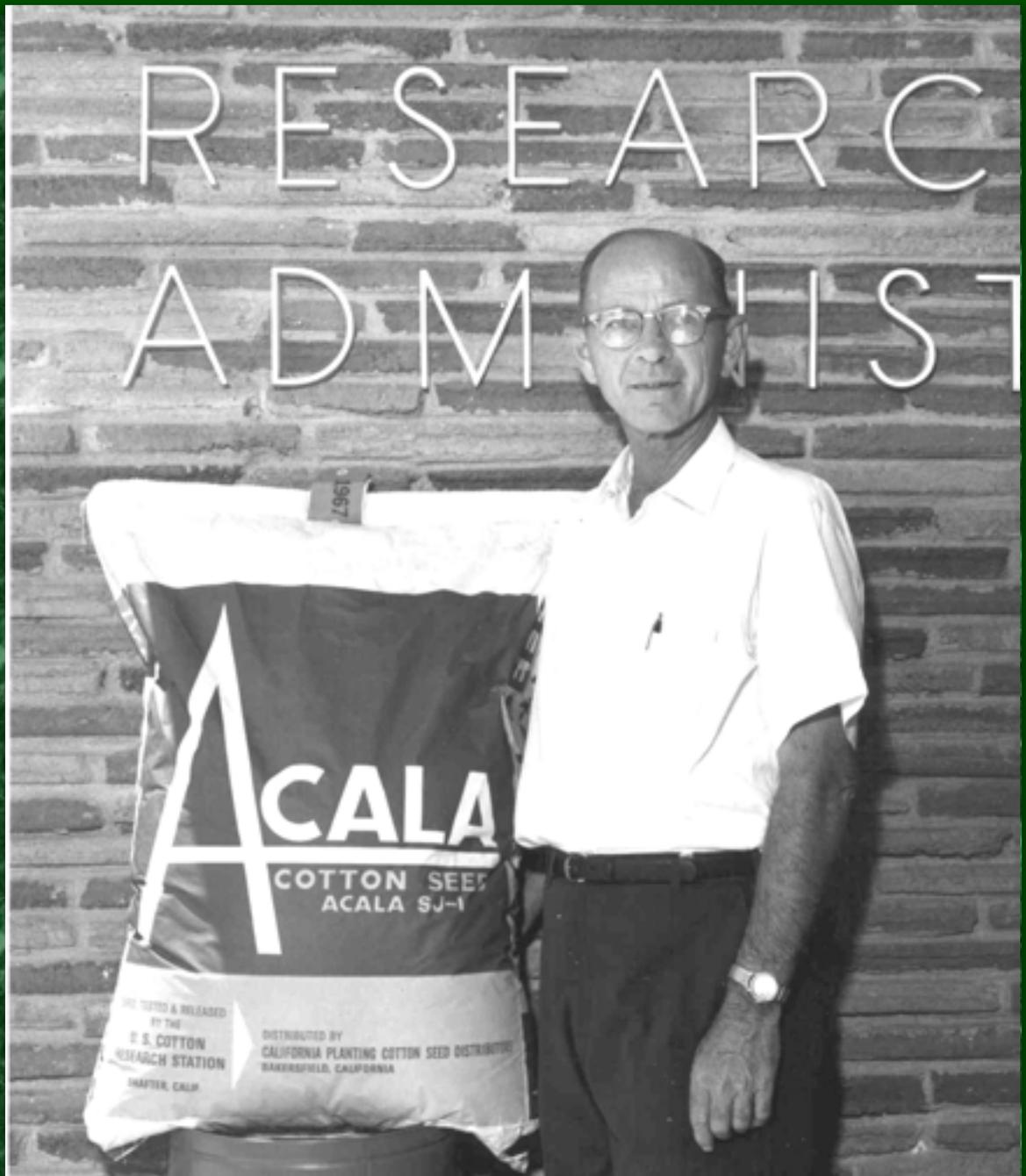
- George Harrison assigned as Director
- Verticillium tolerant strains
- Insect problems and control strategies
- Geneticist, Entomologist and Pathologist
- Major Accomplishment – Acala 4-42
  - Planted to one-variety district 1949
  - Established California's claim to high quality
- Station renamed: US Cotton Field Station

John Turner and Bill Camp  
Acala 4-42



John Turner  
3<sup>rd</sup> Station Director

Acala SJ series



# 1952: Beginning of Golden Age

- **John Turner becomes leader**
  - **Originator of Acala SJ series of cottons**
    - **Introduced new germ plasm**
    - **Increased verticillium tolerance**
    - **All current cottons derived from this stock**
  - **Releases SJ-1 and completes SJ-2**
- **USDA and University add disciplines**
  - **“Seed and information to grow the seed”**
- **New offices and laboratories**

# Golden Age

## Resident Projects with Leader and Staff

- **USDA, ARS**
  - Variety Breeding
  - Genetics
  - Variety Improvement
  - Special Traits Breeding
  - Engineering
  - Nematology
  - Weed Science
  - Weed Physiology
  - Forage Crops
  - Small Seed Crops
  - Physiology *Plant Growth*
  - Physiology *Aflatoxin*
  - Pathology
  - Castor bean Harvesting
- **University of California**
  - Irrigation
  - Entomology
  - Fertility
  - Extension
  - Sweet Potato breeding
  - Vegetable Crops
- **CPCSD**
  - Variety Management

# New Office 1952



# Campus 1970



**H.B. Cooper**  
**1<sup>st</sup> Research Leader**  
**Released SJ-2, 3, 4, & 5**



# 1967: Shift in Leadership

- **H.B. Cooper: breeder and leader**
  - “Director” position redefined as two positions
    - “Research Leader”
      - responsible for all ARS research
    - “Location Leader”
      - responsible for station administration
  - Releases SJ-2 and SJ-5
- **Name Change: “US Cotton Research Station”**

Lyle Carter  
2<sup>nd</sup> Research Leader  
Systems Research



# 1976: Leadership Changes Again

- **Role of breeder shifts from leader to project**
- **Lyle Carter becomes Research Leader**
  - **ARS program renamed “Cotton Systems”**
    - **Emphasis on agronomic systems for cotton**
  - **Initiates the Zone Production System Research**

# 1978: USDA Program Change

- **Mission of ARS at Shafter changes**
  - ARS no longer responsible for the one variety system
    - US Dept of Justice rules: “system may be a monopoly”
    - ARS program concentrates on Cotton Production
    - Breeding research limited to special traits development
    - All cotton germ plasm made available to industry
- **CPSCD becomes a private breeding organization**
  - ARS breeder joins CPCSD as director of research

# Last Day as USDA Station



# 1996: The Station Changes

- **Management shifts to Univ. of Calif.**
- **Land and facilities deeded to Kern County**
  - **Regardless of source of original funds**
- **New cooperative agreement**
  - **ARS will remain at the Shafter site**
  - **UC will manage land and facilities**
  - **Kern County provides use of land and facilities**
- **New Name:**
  - **Shafter Research and Extension Center**

# Station Impact on Cotton: I

- **Cotton varieties**
  - **High quality with consistent premiums**
    - **SJ-2 and progeny**
  - **World renown and demand for seed and lint**
  - **Gossypol free seed and plant**
  - **Verticillium resistance/tolerance**
  - **Basic genetics**
    - **Brown lint problem to niche market**
  - **High yields**

# Station Impact on Cotton: II

- **Cotton production practices**
  - **Basic nitrogen fertilization relationships**
  - **Practices for increased water penetration**
  - **Irrigation frequency studies**
  - **Crop rotation studies**
  - **Feasibility of “broadcast” planted systems**
  - **Methodology to assess seed quality**

# Station Impact on Cotton: III

- **Knowledge for efficient production**
  - Remote sensing of cotton environment
  - Models for plant and production
  - Expert system for diagnosis
  - Multidiscipline integration
  - Precision farming
  - Conservation tillage systems

# Station Impact on Cotton: IV

- **Efficient and high quality harvest**
  - **Harvester development**
  - **Defoliation**
  - **Irrigation/Fertility management**
  - **Growth regulators**
  - **Physiology of abscission**
  - **Progress to eliminate sticky cotton**
  - **Methodology for minimization of contaminants**
  - **Vertical studies: field – gin – spin – weave**

# Station Impact of Cotton: V

- **Pest Management**
  - Cultural and chemical nematode control
  - Pre-emergence weed control in arid culture
  - Perennial weed control systems
  - Physiology of nutsedge
  - Lygus pheromone search
  - Bio-control of spider mite
  - Fusarium/nematode syndrome
  - Aflatoxin in cotton seed

# Station Impact on Cotton: V

- **Pest management (continued)**
  - Cultural control of verticillium wilt
  - Remote sensing of pest populations
  - Methods for distributing bio control agents
  - Seedling disease complex
  - Integrated pest management
  - Integrated weed management
  - Pink bollworm cultural control

# Station Impact on Cotton: VI

- **Agronomic systems**
  - Precision tillage
  - Controlled traffic systems
  - Zone system concept
  - Narrow row culture
  - Alternate stalk management systems
- **Automation**
  - Feedback control
  - Serial bus

# Station Life 1920's-1940's

- **Work**

- Selfing
- Rogueing
- Ginning
- Harvesting
- Fiber lab
- Animal power

- **People**

- Mess club
- Homes
- Sports
- Gardens
- Guest house
- Family



# Fiber Lab 1960

